FORM PTO-1390 (REV. 5-93)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 10191/1832

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
09/857362

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED:
PCT/DE99/03145	**30 September 1999 (30.09.99)**	**02 December 1998 (02.12.98)**

TITLE OF INVENTION
METHOD, RECEIVER AND TRANSMITTER FOR TRANSMITTING DIGITALLY CODED TRAFFIC INFORMATION

APPLICANT(S) FOR DO/EO/US
Bernd HESSING, Stefan GOSS, and Wolfgang WUNDERLICH

Applicants herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) immediately rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) (unsigned).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
14. ☒ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: International Search Report (translated), Preliminary Examination Report and PCT/RO/101.

EXPRESS MAIL NO.:

U.S. APPLICATION NO. (if known, see 37 C.F.R.1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/857362	PCT/DE99/031495	10191/1832

17. ☒ The following fees are submitted:	CALCULATIONS | PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EUROPEAN PATENT OFFICE or JPO $860.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) $690.00	
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) $710.00	
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO $1,000.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) $100.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$

Claims	Number Filed	Number Extra	Rate	
Total Claims	18 - 20 =	0	X $18.00	$ 0
Independent Claims	3 - 3 =	0	X $80.00	$ 0
Multiple dependent claim(s) (if applicable)			+ $270.00	$
TOTAL OF ABOVE CALCULATIONS =				$ 860
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				$
SUBTOTAL =				$ 860
Processing fee of $130.00 for furnishing the English translation later the ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			+	$
TOTAL NATIONAL FEE =				$ 860
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property			+	$
TOTAL FEES ENCLOSED =				$ 860
			Amount to be: refunded	$
			charged	$

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 11-0600 in the amount of **$860.00** to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 11-0600. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

By, Reg. No. 41,172)

Thelma Y. Mayo
SIGNATURE

SEND ALL CORRESPONDENCE TO:
Kenyon & Kenyon
One Broadway
New York, New York 10004

Richard L. Mayer, Reg. No. 22,490
NAME

6/4/01
DATE

26646
PATENT TRADEMARK OFFICE

[10191/1832]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s)	:	HESSING et al.
Serial No.	:	To Be Assigned
Filed	:	Herewith
For	:	METHOD, RECEIVER AND TRANSMITTER FOR TRANSMITTING DIGITALLY CODED TRAFFIC INFORMATION
Art Unit	:	To Be Assigned
Examiner	:	To Be Assigned

Assistant Commissioner
for Patents
Washington, D.C. 20231
Box Patent Application

PRELIMINARY AMENDMENT AND
37 C.F.R. § 1.125 SUBSTITUTE SPECIFICATION STATEMENT

SIR:

Please amend the above-identified application before examination, as set forth below.

IN THE SPECIFICATION AND ABSTRACT:

In accordance with 37 C.F.R. § 1.121(b)(3), a Substitute Specification (including the Abstract, but without claims) accompanies this response. It is respectfully requested that the Substitute Specification (including Abstract) be entered to replace the Specification of record.

IN THE CLAIMS:

On the first page of the claims, first line, change "What is claimed is:" to:

--What Is Claimed Is:--.

Please cancel original claims 1 to 17, without prejudice, and cancel substitute claim 1, without prejudice, in the underlying PCT Application No. PCT/DE99/03145.

EL 244503951

Please add the following new claims:

18. (New) A method of transmitting digitally coded traffic information, comprising the step of:

transmitting the digitally coded traffic information according to predetermined regulations between a transmitter and at least one receiver via at least one of a unidirectional information channel and a bidirectional information channel, wherein:

a subset of the predetermined regulations is defined, and

the digitally coded traffic information is always at least one of coded, transmitted, and decoded according to the subset.

19. (New) The method according to claim 18, wherein:

the subset provides for information options, and

the information options provide for at least one information block.

20. (New) The method according to claim 19, wherein:

the information options provide for one information block.

21. (New) The method according to claim 19, wherein:

the information block provides for one single-information option, and

the single-information option of the subset provides for at least one of a first extent-of-increase symbol and a second extent-of-increase symbol.

22. (New) The method according to claim 19, wherein:

one of the at least one information block provides for a single-event option that provides for an item of length information.

23. (New) The method according to claim 19, wherein:

one of the at least one information block provides for a multiple-use option that provides for one optional event.

24. (New) The method according to claim 19, wherein:

the subset provides for an information portion,

the information portion provides for an item of location information, and

the item of location information of the subset is present in the information portion in coded form according to a location table.

25. (New) A receiver for receiving and processing digitally coded traffic information, comprising:

an arrangement for decoding the digitally coded traffic information according to a subset of predetermined regulations.

26. (New) The receiver according to claim 25, further comprising:

a receiving unit for receiving a signal that includes the digitally coded traffic information.

27. (New) The receiver according to claim 25, further comprising:

a transmitting unit for transmitting a signal including at least one of an information inquiry and the digitally coded traffic information.

28. (New) The receiver according to claim 25, further comprising:

a TMC decoder by which the digitally coded traffic information can be decoded according to the subset.

29. (New) The receiver according to claim 25, further comprising:

a memory for storing the digitally coded traffic information.

30. (New) The receiver according to claim 25, further comprising:

a navigation unit that includes an arrangement for processing an information content of a traffic message.

31. (New) A transmitter for performing a conditioning and a transmitting of digitally coded traffic information, comprising:

an arrangement for coding the digitally coded traffic information according to a subset of predetermined regulations.

32. (New) The transmitter according to claim 31, further comprising:

a transmitting unit for transmitting a signal that includes the digitally coded traffic information.

33. (New) The transmitter according to claim 31, further comprising:

a receiving unit for receiving a signal that includes at least one of an information inquiry and the digitally coded traffic information.

34. (New) The transmitter according to claim 31, further comprising:

a TMC coder for coding the digitally coded traffic information according to the subset.

35. (New) The transmitter according to claim 31, further comprising:

a memory for storing a traffic message.

Remarks

This Preliminary Amendment cancels original claims 1 to 17, without prejudice, and cancels substitute claim 1, without prejudice, in the underlying PCT Application No. PCT/DE99/03145. The Preliminary Amendment also adds new claims 18-35. The new claims conform the claims to U.S. Patent and Trademark Office rules and do not add new matter to the application.

In accordance with 37 C.F.R. § 1.121(b)(3), the Substitute Specification (including the Abstract, but without the claims) contains no new matter. The amendments reflected in the Substitute Specification (including Abstract) are to conform the Specification and Abstract to U.S. Patent and Trademark Office rules or to correct informalities. As required by 37 C.F.R. § 1.121(b)(3)(iii) and § 1.125(b)(2), a Marked Up Version Of The Substitute Specification comparing the Specification of record and the Substitute Specification also accompanies this Preliminary Amendment. Approval and entry of the Substitute Specification (including Abstract) are respectfully requested.

The underlying PCT Application No. PCT/DE99/03145 includes an International Search Report, dated March 17, 2000, and an International Preliminary Examination Report, dated March 21, 2001, copies of which are submitted herewith.

Applicants assert that the subject matter of the present application is new, non-obvious, and useful. Prompt consideration and allowance of the application are respectfully requested.

Respectfully Submitted,

KENYON & KENYON

By: [signature] (Reg. No. 44,172)

Dated: 6/4/01

By: [signature]
Richard L. Mayer
(Reg. No. 22,490)

One Broadway
New York, NY 10004
(212) 425-7200

METHOD, RECEIVER AND TRANSMITTER FOR TRANSMITTING DIGITALLY CODED TRAFFIC INFORMATION

Field Of The Invention

The present invention relates to a method, a receiver, and a transmitter for transmitting digitally coded traffic information.

Background Information

The European Draft Standard ENV/278/4/1/0012 describes a coding protocol for traffic information which is able to communicate information concerning many types of traffic information. Included is construction-site information, weather information, information about traffic disruptions or the like, the information touching upon national and international primary routes, regional routes, as well as local and rural routes.

Summary Of The Invention

In contrast, the method of the present invention, the receiver of the present invention, and the transmitter of the present invention have the advantage that a subset of the regulations predetermined in the European Draft Standard is used for coding and decoding traffic information. Traffic messages can thereby be kept shorter and are less complex. First of all, this facilitates the coding of traffic information coded according to the subset, because it is only necessary to take a smaller number of information options into account. Furthermore, the use of the subset according to the present invention facilitates the transmission of traffic information, because the traffic information thus coded is shorter. Moreover, the decoding of traffic information by the use of the subset, according to the present invention, of the predetermined regulations for coding traffic information is made easier, because the traffic

information contains less optional information.

It is advantageous that the information options of the subset provide for exactly one information block. The traffic information can thereby be kept smaller, which leads to a shorter transmission time, lower transmission costs, and a simpler processing of the traffic information.

If the method of the present invention is carried out according to the RDS (Radio Data System) code, not more than double groups are thereby possible as multiple groups. The fact that information options of the subset allow for exactly one information block can also be expressed in the manner that, according to the present invention, information options may not have a separator which separates the information blocks from one another. The predetermined length of one information block, together with the regulation that no separator may be present in an information option leads to the fact that traffic information which is coded according to the subset includes double groups at most. The same result follows due to the requirement that information options may contain only one information block.

It is also advantageous that a first extent-of-increase symbol and/or a second extent-of-increase symbol can occur as a single-information option within an information block. The extent-of-increase symbols are used to precisely characterize the extent of a traffic disruption. Particularly for navigational purposes, it is important to supply precise information regarding the extent of traffic disturbances to a navigation unit. On the other hand, other possible components of a single- information option are not provided in the subset for the coding of traffic information. This serves to reduce the coding and decoding expenditure.

It is furthermore advantageous that a single-event option only provides for a second piece of length information. Other possible components of a single-event option are therefore not provided in the subset for the coding of traffic information. This helps to simplify the coding and decoding process.

Another advantage is that a multiple-use option provides for one optional event. Because of this, information can be transmitted about complex situations, since more than one event can be transmitted per piece of traffic information. In addition, it is advantageous that, for each optional event, one piece of length information is transmittable as single-event option in the information block.

Moreover, it is advantageous that one piece of location information, which is provided in the information portion of the traffic information coded according to the subset, is present in coded form in accordance with a location table. Location information, which is transmitted in the information portion, is thereby not permissible in the form of a piece of EUROAD location information, which leads to a simpler structure of the traffic information.

It is advantageous if the receiver of the present invention has a receiving unit, signals which include traffic information coded according to the subset being receivable by the receiving unit. Because of this, it is possible for a mobile device according to the present invention to receive and to further process traffic information coded according to the subset.

Furthermore, it is advantageous that the receiver of the present invention has a transmitting unit, signals which include information inquiries and/or coded traffic information being transmittable by the transmitting unit. Thus, for example, with the aid of a mobile receiver which has a transmitting unit, signals such as information inquiries, traffic messages, coded traffic information or the like can be sent to a transmitter.

It is expedient if the receiver of the present invention includes a TMC decoder by which traffic information can be decoded according to the subset. This permits the receiver to selectively process the traffic information coded according to the subset.

It is particularly advantageous if the receiver of the present invention and the transmitter of the present invention have a memory in which traffic messages, coded

according to the subset, can be stored. Due to the coding of the traffic messages according to the subset of the predetermined regulations, less memory space is required in the memory per traffic message. Therefore, given the same capacity, a memory in the receiver according to the present invention and in the transmitter according to the present invention can accommodate more traffic messages, or it can have smaller dimensions for the same number of traffic messages.

It is also advantageous that the receiver of the present invention has a navigation unit which includes an arrangement for processing the information content of traffic messages. In this manner, a navigational task can be carried out more quickly and easily through the use of traffic information coded according to the subset of the predetermined regulations.

It is advantageous that the transmitter has a transmitting unit, signals which include coded traffic information being transmittable by the transmitting unit. For example, it is possible for a preferably stationary transmitter of the present invention, which has a transmitting unit, to dispatch signals which include traffic information coded according to the subset. The traffic information sent out in this manner can then be received by a mobile receiver via a public or a private communication channel.

It is advantageous that the transmitter has a receiving unit, signals which include information inquiries and/or coded traffic information being receivable by the receiving unit. A receiving unit permits the transmitter to receive information from one or more receivers, and thereby to send traffic information selectively to specific receivers, i.e. to send a specific selection of traffic information to certain receivers.

It is moreover advantageous that the transmitter includes a TMC coder by which traffic information, coded according to the subset, can be coded. In this manner, traffic information coded according to the subset can be transmitted to one or more receivers. An agreement for the exclusive transmission of traffic information, coded according to the subset, is advantageous. Because the receiver receives only such traffic information which is coded according to the subset, it can have a simpler and

therefore more cost-effective design. In addition, this leads to a simpler transmit mode in the transmitter, because according to the present invention, the traffic information is small.

Brief Description Of The Drawings

Figure 1 shows a representation of one piece of traffic information.

Figure 2 shows a representation of one piece of location information.

Figure 3 shows a representation of one information option.

Figure 4 shows a representation of one information block.

Figure 5 shows a representation of one single-information option.

Figure 6 shows a block diagram of a first exemplary embodiment of the receiver according to the present invention.

Figure 7 shows a block diagram of a second exemplary embodiment of the receiver according to the present invention.

Figure 8 shows a block diagram of a first exemplary embodiment of the transmitter according to the present invention.

Detailed Description

Figures 1 through 5 show a coding protocol for TMC traffic messages according to a subset of the ALERT-C Syntax. This Syntax is specified in the European Draft Standard cited. When introducing new terms, the corresponding English term from the European Draft Standard is indicated in parentheses. The method of the present invention utilizes a subset of the standardized regulations, for example, of the

ALERT-C Syntax, for coding and decoding traffic information. The method of the present invention for coding traffic messages exclusively uses regulations which likewise occur in the quantity of standardized regulations, for example, of the ALERT-C Syntax. However, from this quantity of regulations, a subset is selected in order to more effectively carry out the coding, the transmission and the decoding of traffic information. The subset, selected according to the present invention, is selected in view of a particularly effective processing of the traffic information. For example, according to the present invention, the selection of the subset is particularly suitable for more effective navigation, especially of vehicles. The selection of the subset in view of this exemplary usage is described in the following on the basis of the selection, according to the present invention, of a subset of the ALERT-C Syntax. However, the selection of a subset from a quantity of predetermined regulations is restricted neither to a quantity of regulations in conformance with the ALERT-C Syntax, nor is it restricted to a quantity of regulations in conformance with the RDS (Radio Data System) Standard or with the TMC (Traffic Message Channel) Standard.

Figure 1 shows the representation of one piece of traffic information 410. Traffic information 410 is made of an information portion (MandatoryTokens) and of information options 440 (OptionTokens). The information portion is composed of one piece of event information 420 (Event) and of one piece of location information 430 (LocationTokens). Event information 420 and location information 430 together form the information portion of traffic information 410, the sequence of event information 420 and location information 430 in the information portion being irrelevant.

Figure 2 shows location information 430. It is composed in succession of a first location 450 (PrimaryLocation), a piece of extent information 460 (Extent) and a piece of direction information 470 (Direction).

Figure 3 shows information option 440. It is composed either of one piece of single-group information (SingleGroupOptions) or of one or more information blocks (500) (Infoblock). If information options 440 include multiple-group options, for example, according to the RDS-TMC Standard, then the multiple-group options are

composed of information blocks 500. In the following, one information option 440 is made either of single-group options or of one or more information blocks 500. According to the present invention,,information options 440 are composed of precisely one information block 500. The single-group options can include one piece of diversion information 480 (DiversionBit) and one piece of disruption-duration information 490 (DurationCode).

Figure 4 shows information block 500 (Infoblock). Information block 500 can include a single-information option 510 (SinglePerMessageOpt), a multiple-use option 520 (MultipleUseOption) and/or a single-event option 530 (SinglePerEventOpt).

Figure 5 shows a single-information option 510. It is composed of a first extent-of-increase symbol 540 (CtrlIncrExtent8) and/or of a second extent-of-increase symbol 550 (CtrlIncrExtent16).

According to the ALERT-C Syntax, traffic information 410, for example, TMC traffic messages (Traffic Message Channel), is composed of the information portion and information options 440.

According to the TMC Standard for traffic messages, traffic information 410 is possible composed of one group of information, and traffic information 410 is possible composed of a plurality of groups of information. (see cited standard page 43ff). According to the present invention, only traffic information is possible which is composed of one or two groups. However, the present invention is not bound to a use according to the RDS-TMC Standard. The information portion is contained in each piece of coded traffic information 410, while information options 440 are only optionally contained in traffic information 410. This is shown in Figure 1. The information portion as an obligation includes event information 420 and location information 430. The sequence of event information 420 and location information 430 is unimportant in the information portion; however, the presence of both pieces of information is necessary. Event information 420 contains the event of traffic information 410 in the form of an event code (EventCode). Using a table of possible

events, thus an event list (EventList), the event can be described with the aid of event information 420.

In one advantageous specific embodiment of the method according to the present invention, the event list of the present invention is reduced compared to the event list of the ALERT-C Syntax, so that events which occur in the event list of the ALERT-C Syntax are not allowed according to the subset of the present invention, that is to say, a plurality of events from the event list of the ALERT-C Syntax are mapped onto one event from the event list of the present invention.

According to the ALERT-C Syntax, location information 430 includes one first location 450, one piece of extent information 460 and one piece of direction information 470. According to the ALERT-C Syntax, first location 450 can be described either on the basis of a location code (LocationCode) using a location table, or with the aid of a EUROAD location (EUROAD Location). In one particularly advantageous specific embodiment of the method according to the present invention, first location 450 is described exclusively with the aid of the location code and the location table, the method thereby being simplified, particularly with respect to decoding, coding, and error handling.

Extent information 460 and direction information 470 are used im accordance with the regulations of the ALERT-C Syntax in the subset, according to the present invention, of the ALERT-C Syntax, as well.

Information options 440 of the ALERT-C Syntax and their use according to the subset are described in the following. According to the RDS-TMC Standard, information options 440 include either the single-group options, or one or more information blocks 500. The single-group information includes diversion information 480 and disruption-duration information 490. If information options 440 are composed of one piece of single-group information, then information options 440 include diversion information 480 and disruption-duration information 490.

On the other hand, information options 440 can be composed of one or more information blocks 500. According to the ALERT-C Syntax, a plurality of information blocks are separated by separators (Separator). The use of separators, and thus of at least two information blocks, requires that traffic information 410 be composed of at least three groups according to the RDS-TMC Standard. This should be avoided with the method of the present invention. In the present invention, the number of groups of one piece of traffic information 410 should amount to two at the most. Therefore, the use of a separator in a multiple-group option 500 is not provided in the method according to the present invention. Consequently, information options 440 of the present invention are composed merely of one information block 500 or of single-group options.

According to the subset of the present invention, one information block 500 can be made of single-information options 510, multiple-use options 520 or single-event options 530.

According to the method of the present invention, a single-information option 510 can contain only a first extent-of-increase symbol 540 and/or a second extent-of-increase symbol 550.

In accordance with the subset, according to the present invention, of the ALERT-C Syntax, a multiple-use option 520 can allow for only one optional event (OptEvent).

According to the method of the present invention, a single-event option 530 can provide for only one piece of length information (Length). In this context, the length information can relate to event information 420. When an optional event in a multiple-use option 520 is also transmitted in traffic information 410, then a further single-event option 530 can provide a further piece of length information with respect to the optional event. Therefore, it is possible, for each event, to transmit a piece of length information as single-event option 530.

In one particularly advantageous specific embodiment of the present invention, further

information options 440 are not provided. This simplifies traffic information 410, as well as its coding, decoding and processing.

Figure 6 shows a block diagram of a first exemplary embodiment of a receiver 300 with which the method of the present invention can be carried out. Receiver 300 includes a receiving unit 311 which is connected to an evaluation circuit 320. Evaluation circuit 320 is connected to a distribution device 340. Further connected to distribution device 340 are a memory 342, a navigation unit 360, reproduction devices 384, as well as input devices 382. Navigation unit 360 is also connected to a navigation data memory 362. Receiver 300 is designed in particular as a mobile device 300 for the reception of traffic messages 410, coded according to the method of the present invention, for example, in a vehicle.

Figure 7 shows a block diagram of a second exemplary embodiment of receiver 300 according to the present invention; in the second exemplary embodiment of receiver 300 according to the present invention, evaluation circuit 320, in addition to being connected to receiving unit 311, is also connected to a transmitting unit 310. Otherwise, the same reference numerals from Figure 6 are used for units and devices of receiver 300 having essentially the same function. The transmitting unit is used, for example, to dispatch information inquiries, traffic messages, coded traffic information or the like. Receiver 300 could also be called a transmitter-receiver, inasmuch as receiver 300 can also include a transmitting unit 310. However, when implementing the method, preferably mobile receiver 300 is used chiefly as a receiver, which is why the term "receiver" was selected.

In one advantageous specific embodiment of receiver 300 of the present invention, receiving unit 311 and transmitting unit 310 can also be combined to form one transmitter-receiver unit. In particular, such a transmitter-receiver unit can be designed in such a way that it includes a mount for a portable telecommunication terminal, e.g. a mobile telephone, so that the transmitter-receiver unit is only operable after connection of the portable telecommunication terminal to the transmitter-receiver unit, for example by insertion or the like. The various units and

devices of the receiver of the present invention according to the first exemplary embodiment and according to the second exemplary embodiment can be distributed over various housings, or be integrated in one housing. In this context, in particular individual units and devices of receiver 300 of the present invention can be combined in one housing with a further device. Thus, for example, it is possible to integrate input device 382 and reproduction device 384 in one broadcast receiver. In this case, the broadcast receiver is connected to receiver 300 via a wire-conducted or wireless connection, e.g. a CAN bus or the like.

With the aid of receiving unit 311, traffic information 410 can be received and evaluated in evaluation circuit 320. To that end, evaluation circuit 320 is assigned a TMC decoder which decodes the arriving traffic information. Received traffic information 410 can be routed from evaluation circuit 320 via distribution device 340 to memory 342, navigation unit 360 and/or output device 384. Traffic information 410 can be stored in memory 342 when, for example, it is received at regular or irregular time intervals by receiving unit 311 of receiver 300. Due to traffic information 410 stored in memory 342, traffic information 410 can be processed, for example, by navigation unit 360 regardless of whether traffic information 410 is arriving or not.

Traffic messages 410 are coded according to predetermined regulations, for example, according to the ALERT-C Syntax. In the present invention, the selection of a subset of these regulations makes it possible to keep memory 342 small for a predetermined amount of traffic information 410 to be stored, or to utilize memory 342 for a greater amount of traffic information 410, because traffic information 410 turns out to be smaller according to the present invention than according to the predetermined regulations, for example, of the ALERT-C Syntax. This is attributable in particular to the fact that, when working with the subset of the present invention, only traffic information 410 is dealt with which includes two groups at the most. Due to the thus shorter transmission times of traffic information 410, in addition, more information 410 can be received by receiving unit 311 per time unit.

Furthermore, traffic information 410 is decoded in evaluation circuit 320 more

quickly and with less expenditure.

According to the present invention, only the information necessary for the main purpose of the information processing is coded in one piece of traffic information 410. By way of example, the subset of the present invention is selected which is particularly important for processing traffic information 410, e.g. in navigation unit 360, for carrying out navigation tasks. For this purpose, in the method of the present invention and when working with receiver 300 of the present invention, only the information from the possible information supply of the predetermined regulations, particularly of the ALERT-C Syntax, which is important with regard to carrying out navigation tasks is selected for the subset. Thus, for example, the selection of first and second extent-of-increase symbols 540, 550 from the quantity of possible information options for single-information option 510 is understandable, since the extent of a traffic disruption is very important for determining the optimal navigation, for instance, of a vehicle.

Figure 8 shows a block diagram of a first exemplary embodiment of transmitter 301 according to the present invention. In the first exemplary embodiment of transmitter 301 of the present invention, transmitter 301 is used in particular as a stationary transmitter for transmitting traffic information 410 to at least one receiver via a preferably wireless communication channel. The communication channel can be unidirectional or bidirectional. The use of an SMS (Service Management System) Cellbroadcast method, particularly in a GSM radio communications network, a classic radio program transmission or the like, for the information transfer between transmitter 301 and receiver 300 can be mentioned here as an example of a unidirectional communication channel. The utilization of a short-message channel, e.g. the SMS short-message channel in a GSM radio communications network or the like, is mentioned here as an example of a bidirectional communication channel. Transmitter 301 includes a transmitting unit 312 which is connected to a conditioning circuit 321. Conditioning circuit 321 is connected to a distribution device 340. Distribution device 340 is connected to a memory 342 and an information source 395. Memory 342 contains traffic information 410 which can be supplied to conditioning

circuit 321 via distribution device 340. Allocated to conditioning circuit 321 is a coder for traffic information 410, particularly TMC-coded traffic information, which codes traffic information 410 in accordance with the subset, according to the present invention, of a coding protocol, for example, the ALERT-C Syntax. Traffic information 410 coded in this manner can subsequently be transmitted by transmitting unit 312 via a public or private communication channel. Information source 395 passes on information via distribution device 340 to memory 342 and/or conditioning circuit 321. On the one hand, this information contains traffic information 410, e.g. concerning currently existing traffic disruptions or their absence. The information supplied by information source 395 also includes information about information inquiries or the like, particularly from one or more receivers 300. To receive signals from receiver 300, for example, of information inquiries or the like, in one preferred specific embodiment, a receiving unit is allocated to information source 395 of transmitter 301. The receiving unit is able to receive information from a receiver 300 via a communication channel agreed upon between receiver 300 and transmitter 301. Because of the presence of a receiving unit in transmitter 301, transmitter 301 could also be called a transmitter-receiver. Here, however, the designation transmitter 301 was selected, because transmitter 301 is used predominately to send traffic information to one or more receivers 300.

Traffic information 410 is coded in conditioning circuit 321 as a function of the information supplied by information source 395 and as a function of traffic information 410 located in memory 342, the coding being carried out according to the subset of the present invention.

Public or private communication channels are suitable for the communication between receiver 300 according to the first or the second exemplary embodiment and transmitter 301. When using a private communication channel, e.g. according to the GSM Standard, transmitter 301 transmits traffic information 410 according to the subset to receiver 300, for instance, via a short-message channel, in particular using SMS short messages. When sending traffic information 410 using SMS short messages, the method of the present invention, receiver 300 of the present invention

and transmitter 301 of the present invention again offer the advantage that more traffic information 410 can be transmitted per SMS short message, because the coding of traffic information 410 in accordance with the subset, according to the present invention, of the predetermined regulations results in smaller pieces of traffic information.

Transmitting unit 310 of receiver 300 makes it possible, for example, to dispatch information inquiries to transmitter 301. Transmitter 301 receives the information inquiry from preferably mobile receiver 300, and sends traffic information 410 to receiver 300 via a public or private communication channel, traffic information 410 being received by receiving unit 311 of receiver 300 and being processed by the further device and units of receiver 300 and output to a user by output device 384.

Input devices 382 permit the user to input, for example, information about the navigation destination into receiver 300. Input device 382 routes the input information of the user to distribution device 340, which supplies it in particular to navigation unit 360. As a function of the input information, navigation unit 360, via distribution device 340, causes evaluation circuit 320 to generate an information inquiry according to the subset of the present invention in a TMC coder allocated to evaluation circuit 320. The information inquiry can be sent to transmitter 301 by transmitting unit 310.

Abstract Of The Disclosure

A method and a device are proposed which are used for transmitting digitally coded traffic information according to predetermined regulations from a transmitter to at least one receiver via a communication channel, a subset of the predetermined regulations being defined and the traffic information being coded, transmitted and

[10191/1832]

METHOD, RECEIVER AND TRANSMITTER FOR TRANSMITTING DIGITALLY CODED TRAFFIC INFORMATION

Field Of The Invention

The present invention [is based on] relates to a method [according to the species defined in the Main Claim], a receiver [according to the species defined in the alternative independent Claim 7], and a transmitter [according to the species defined in the alternative independent Claim 13.] for transmitting digitally coded traffic information.

Background Information

The European Draft Standard ENV/278/4/1/0012 describes a coding protocol for traffic information which is able to communicate information concerning many types of traffic information. Included is construction-site information, weather information, information about traffic disruptions or the like, the information touching upon national and international primary routes, regional routes, as well as local and rural routes.

Summary [of the] Of The Invention

In contrast, the method of the present invention [having the features of the Main Claim], the receiver of the present invention [having the features of the alternative independent Claim 7], and the transmitter of the present invention [having the features of the alternative independent Claim 13] have the advantage that a subset of the regulations predetermined in the European Draft Standard is used for coding and decoding traffic information. Traffic messages can thereby be kept shorter and are less complex. First of all, this facilitates the coding of traffic information coded according to the subset, because it is only necessary to take a smaller number of

information options into account. Furthermore, the use of the subset according to the present invention facilitates the transmission of traffic information, because the traffic information thus coded is shorter. Moreover, the decoding of traffic information by the use of the subset, according to the present invention, of the predetermined regulations for coding traffic information is made easier, because the traffic information contains less optional information.

[The measures specified in the dependent claims permit advantageous further developments and improvements of the method indicated in the Main Claim and the device indicated in the alternative independent claim.]

It is advantageous that the information options of the subset provide for exactly one information block. The traffic information can thereby be kept smaller, which leads to a shorter transmission time, lower transmission costs, and a simpler processing of the traffic information.

If the method of the present invention is carried out according to the RDS (Radio Data System) code, not more than double groups are thereby possible as multiple groups. The fact that information options of the subset allow for exactly one information block can also be expressed in the manner that, according to the present invention, information options may not have a separator which separates the information blocks from one another. The predetermined length of one information block, together with the regulation that no separator may be present in an information option leads to the fact that traffic information which is coded according to the subset includes double groups at most. The same result follows due to the requirement that information options may contain only one information block.

It is also advantageous that a first extent-of-increase symbol and/or a second extent-of-increase symbol can occur as a single-information option within an information block. The extent-of-increase symbols are used to precisely characterize the extent of a traffic disruption. Particularly for navigational purposes, it is important to supply precise information regarding the extent of traffic disturbances to a

navigation unit. On the other hand, other possible components of a single- information option are not provided in the subset for the coding of traffic information. This serves to reduce the coding and decoding expenditure.

It is furthermore advantageous that a single-event option only provides for a second piece of length information. Other possible components of a single-event option are therefore not provided in the subset for the coding of traffic information. This helps to simplify the coding and decoding process.

Another advantage is that a multiple-use option provides for one optional event. Because of this, information can be transmitted about complex situations, since more than one event can be transmitted per piece of traffic information. In addition, it is advantageous that, for each optional event, one piece of length information is transmittable as single-event option in the information block.

Moreover, it is advantageous that one piece of location information, which is provided in the information portion of the traffic information coded according to the subset, is present in coded form in accordance with a location table. Location information, which is transmitted in the information portion, is thereby not permissible in the form of a piece of EUROAD location information, which leads to a simpler structure of the traffic information.

It is advantageous if the receiver of the present invention has a receiving unit, signals which include traffic information coded according to the subset being receivable by the receiving unit. Because of this, it is possible for a mobile device according to the present invention to receive and to further process traffic information coded according to the subset.

Furthermore, it is advantageous that the receiver of the present invention has a transmitting unit, signals which include information inquiries and/or coded traffic information being transmittable by the transmitting unit. Thus, for example, with the aid of a mobile receiver which has a transmitting unit, signals such as information

inquiries, traffic messages, coded traffic information or the like can be sent to a transmitter.

It is expedient if the receiver of the present invention includes a TMC decoder by which traffic information can be decoded according to the subset. This permits the receiver to selectively process the traffic information coded according to the subset.

It is particularly advantageous if the receiver of the present invention and the transmitter of the present invention have a memory in which traffic messages, coded according to the subset, can be stored. Due to the coding of the traffic messages according to the subset of the predetermined regulations, less memory space is required in the memory per traffic message. Therefore, given the same capacity, a memory in the receiver according to the present invention and in the transmitter according to the present invention can accommodate more traffic messages, or it can have smaller dimensions for the same number of traffic messages.

It is also advantageous that the receiver of the present invention has a navigation unit which includes [means] an arrangement for processing the information content of traffic messages. In this manner, a navigational task can be carried out more quickly and easily through the use of traffic information coded according to the subset of the predetermined regulations.

It is advantageous that the transmitter has a transmitting unit, signals which include coded traffic information being transmittable by the transmitting unit. For example, it is possible for a preferably stationary transmitter of the present invention, which has a transmitting unit, to dispatch signals which include traffic information coded according to the subset. The traffic information sent out in this manner can then be received by a mobile receiver via a public or a private communication channel.

It is advantageous that the transmitter has a receiving unit, signals which include information inquiries and/or coded traffic information being receivable by the receiving unit. A receiving unit permits the transmitter to receive information from

one or more receivers, and thereby to send traffic information selectively to specific receivers, i.e. to send a specific selection of traffic information to certain receivers.

It is moreover advantageous that the transmitter includes a TMC coder by which traffic information, coded according to the subset, can be coded. In this manner, traffic information coded according to the subset can be transmitted to one or more receivers. An agreement for the exclusive transmission of traffic information, coded according to the subset, is advantageous. Because the receiver receives only such traffic information which is coded according to the subset, it can have a simpler and therefore more cost-effective design. In addition, this leads to a simpler transmit mode in the transmitter, because according to the present invention, the traffic information is small.

Brief Description [of the] Of The Drawings

[Exemplary embodiments of the present invention are explained more precisely in the following description and depicted in the Drawing, in which:]

Figure 1 shows a representation of one piece of traffic information[;].

Figure 2 shows a representation of one piece of location information[;].

Figure 3 shows a representation of one information option[;].

Figure 4 shows a representation of one information block[;].

Figure 5 shows a representation of one single-information option[;].

Figure 6 shows a block diagram of a first exemplary embodiment of the receiver according to the present invention[;].

Figure 7 shows a block diagram of a second exemplary embodiment of the receiver according to the present invention[; and].

Figure 8 shows a block diagram of a first exemplary embodiment of the transmitter according to the present invention.

Detailed Description [of the Exemplary Embodiments]

Figures 1 through 5 show a coding protocol for TMC traffic messages according to a subset of the ALERT-C Syntax. This Syntax is specified in the European Draft Standard cited. When introducing new terms, the corresponding English term from the European Draft Standard is indicated in parentheses. The method of the present invention utilizes a subset of the standardized regulations, for example, of the ALERT-C Syntax, for coding and decoding traffic information. The method of the present invention for coding traffic messages exclusively uses regulations which likewise occur in the quantity of standardized regulations, for example, of the ALERT-C Syntax. However, from this quantity of regulations, a subset is selected in order to more effectively carry out the coding, the transmission and the decoding of traffic information. The subset, selected according to the present invention, is selected in view of a particularly effective processing of the traffic information. For example, according to the present invention, the selection of the subset is particularly suitable for more effective navigation, especially of vehicles. The selection of the subset in view of this exemplary usage is described in the following on the basis of the selection, according to the present invention, of a subset of the ALERT-C Syntax. However, the selection of a subset from a quantity of predetermined regulations is restricted neither to a quantity of regulations in conformance with the ALERT-C Syntax, nor is it restricted to a quantity of regulations in conformance with the RDS (Radio Data System) Standard or with the TMC (Traffic Message Channel) Standard.

Figure 1 shows the representation of one piece of traffic information 410. Traffic information 410 is made of an information portion (MandatoryTokens) and of information options 440 (OptionTokens). The information portion is composed of one piece of event information 420 (Event) and of one piece of location information 430 (LocationTokens). Event information 420 and location information 430 together form the information portion of traffic information 410, the sequence of event information

420 and location information 430 in the information portion being irrelevant.

Figure 2 shows location information 430. It is composed in succession of a first location 450 (PrimaryLocation), a piece of extent information 460 (Extent) and a piece of direction information 470 (Direction).

Figure 3 shows information option 440. It is composed either of one piece of single-group information (SingleGroupOptions) or of one or more information blocks (500) (Infoblock). If information options 440 include multiple-group options, for example, according to the RDS-TMC Standard, then the multiple-group options are composed of information blocks 500. In the following, one information option 440 is made either of single-group options or of one or more information blocks 500. According to the present invention, information options 440 are composed of precisely one information block 500. The single-group options can include one piece of diversion information 480 (DiversionBit) and one piece of disruption-duration information 490 (DurationCode).

Figure 4 shows information block 500 (Infoblock). Information block 500 can include a single-information option 510 (SinglePerMessageOpt), a multiple-use option 520 (MultipleUseOption) and/or a single-event option 530 (SinglePerEventOpt).

Figure 5 shows a single-information option 510. It is composed of a first extent-of-increase symbol 540 (CtrlIncrExtent8) and/or of a second extent-of-increase symbol 550 (CtrlIncrExtent16).

According to the ALERT-C Syntax, traffic information 410, for example, TMC traffic messages (Traffic Message Channel), is composed of the information portion and information options 440.

According to the TMC Standard for traffic messages, traffic information 410 is possible composed of one group of information, and traffic information 410 is possible composed of a plurality of groups of information. (see cited standard page

43ff). According to the present invention, only traffic information is possible which is composed of one or two groups. However, the present invention is not bound to a use according to the RDS-TMC Standard. The information portion is contained in each piece of coded traffic information 410, while information options 440 are only optionally contained in traffic information 410. This is shown in Figure 1. The information portion as an obligation includes event information 420 and location information 430. The sequence of event information 420 and location information 430 is unimportant in the information portion; however, the presence of both pieces of information is necessary. Event information 420 contains the event of traffic information 410 in the form of an event code (EventCode). Using a table of possible events, thus an event list (EventList), the event can be described with the aid of event information 420.

In one advantageous specific embodiment of the method according to the present invention, the event list of the present invention is reduced compared to the event list of the ALERT-C Syntax, so that events which occur in the event list of the ALERT-C Syntax are not allowed according to the subset of the present invention, that is to say, a plurality of events from the event list of the ALERT-C Syntax are mapped onto one event from the event list of the present invention.

According to the ALERT-C Syntax, location information 430 includes one first location 450, one piece of extent information 460 and one piece of direction information 470. According to the ALERT-C Syntax, first location 450 can be described either on the basis of a location code (LocationCode) using a location table, or with the aid of a EUROAD location (EUROAD Location). In one particularly advantageous specific embodiment of the method according to the present invention, first location 450 is described exclusively with the aid of the location code and the location table, the method thereby being simplified, particularly with respect to decoding, coding, and error handling.

Extent information 460 and direction information 470 are used im accordance with the regulations of the ALERT-C Syntax in the subset, according to the present

invention, of the ALERT-C Syntax, as well.

Information options 440 of the ALERT-C Syntax and their use according to the subset are described in the following. According to the RDS-TMC Standard, information options 440 include either the single-group options, or one or more information blocks 500. The single-group information includes diversion information 480 and disruption-duration information 490. If information options 440 are composed of one piece of single-group information, then information options 440 include diversion information 480 and disruption-duration information 490.

On the other hand, information options 440 can be composed of one or more information blocks 500. According to the ALERT-C Syntax, a plurality of information blocks are separated by separators (Separator). The use of separators, and thus of at least two information blocks, requires that traffic information 410 be composed of at least three groups according to the RDS-TMC Standard. This should be avoided with the method of the present invention. In the present invention, the number of groups of one piece of traffic information 410 should amount to two at the most. Therefore, the use of a separator in a multiple-group option 500 is not provided in the method according to the present invention. Consequently, information options 440 of the present invention are composed merely of one information block 500 or of single-group options.

According to the subset of the present invention, one information block 500 can be made of single-information options 510, multiple-use options 520 or single-event options 530.

According to the method of the present invention, a single-information option 510 can contain only a first extent-of-increase symbol 540 and/or a second extent-of-increase symbol 550.

In accordance with the subset, according to the present invention, of the ALERT-C Syntax, a multiple-use option 520 can allow for only one optional event (OptEvent).

According to the method of the present invention, a single-event option 530 can provide for only one piece of length information (Length). In this context, the length information can relate to event information 420. When an optional event in a multiple-use option 520 is also transmitted in traffic information 410, then a further single-event option 530 can provide a further piece of length information with respect to the optional event. Therefore, it is possible, for each event, to transmit a piece of length information as single-event option 530.

In one particularly advantageous specific embodiment of the present invention, further information options 440 are not provided. This simplifies traffic information 410, as well as its coding, decoding and processing.

Figure 6 shows a block diagram of a first exemplary embodiment of a receiver 300 with which the method of the present invention can be carried out. Receiver 300 includes a receiving unit 311 which is connected to an evaluation circuit 320. Evaluation circuit 320 is connected to a distribution device 340. Further connected to distribution device 340 are a memory 342, a navigation unit 360, reproduction devices 384, as well as input devices 382. Navigation unit 360 is also connected to a navigation data memory 362. Receiver 300 is designed in particular as a mobile device 300 for the reception of traffic messages 410, coded according to the method of the present invention, for example, in a vehicle.

Figure 7 shows a block diagram of a second exemplary embodiment of receiver 300 according to the present invention; in the second exemplary embodiment of receiver 300 according to the present invention, evaluation circuit 320, in addition to being connected to receiving unit 311, is also connected to a transmitting unit 310. Otherwise, the same reference numerals from Figure 6 are used for units and devices of receiver 300 having essentially the same function. The transmitting unit is used, for example, to dispatch information inquiries, traffic messages, coded traffic information or the like. Receiver 300 could also be called a transmitter-receiver, inasmuch as receiver 300 can also include a transmitting unit 310. However, when implementing the method, preferably mobile receiver 300 is used chiefly as a receiver, which is why

the term "receiver" was selected.

In one advantageous specific embodiment of receiver 300 of the present invention, receiving unit 311 and transmitting unit 310 can also be combined to form one transmitter-receiver unit. In particular, such a transmitter-receiver unit can be designed in such a way that it includes a mount for a portable telecommunication terminal, e.g. a mobile telephone, so that the transmitter-receiver unit is only operable after connection of the portable telecommunication terminal to the transmitter-receiver unit, for example by insertion or the like. The various units and devices of the receiver of the present invention according to the first exemplary embodiment and according to the second exemplary embodiment can be distributed over various housings, or be integrated in one housing. In this context, in particular individual units and devices of receiver 300 of the present invention can be combined in one housing with a further device. Thus, for example, it is possible to integrate input device 382 and reproduction device 384 in one broadcast receiver. In this case, the broadcast receiver is connected to receiver 300 via a wire-conducted or wireless connection, e.g. a CAN bus or the like.

With the aid of receiving unit 311, traffic information 410 can be received and evaluated in evaluation circuit 320. To that end, evaluation circuit 320 is assigned a TMC decoder which decodes the arriving traffic information. Received traffic information 410 can be routed from evaluation circuit 320 via distribution device 340 to memory 342, navigation unit 360 and/or output device 384. Traffic information 410 can be stored in memory 342 when, for example, it is received at regular or irregular time intervals by receiving unit 311 of receiver 300. Due to traffic information 410 stored in memory 342, traffic information 410 can be processed, for example, by navigation unit 360 regardless of whether traffic information 410 is arriving or not.

Traffic messages 410 are coded according to predetermined regulations, for example, according to the ALERT-C Syntax. In the present invention, the selection of a subset of these regulations makes it possible to keep memory 342 small for a predetermined amount of traffic information 410 to be stored, or to utilize memory 342 for a greater

amount of traffic information 410, because traffic information 410 turns out to be smaller according to the present invention than according to the predetermined regulations, for example, of the ALERT-C Syntax. This is attributable in particular to the fact that, when working with the subset of the present invention, only traffic information 410 is dealt with which includes two groups at the most. Due to the thus shorter transmission times of traffic information 410, in addition, more information 410 can be received by receiving unit 311 per time unit.

Furthermore, traffic information 410 is decoded in evaluation circuit 320 more quickly and with less expenditure.

According to the present invention, only the information necessary for the main purpose of the information processing is coded in one piece of traffic information 410. By way of example, the subset of the present invention is selected which is particularly important for processing traffic information 410, e.g. in navigation unit 360, for carrying out navigation tasks. For this purpose, in the method of the present invention and when working with receiver 300 of the present invention, only the information from the possible information supply of the predetermined regulations, particularly of the ALERT-C Syntax, which is important with regard to carrying out navigation tasks is selected for the subset. Thus, for example, the selection of first and second extent-of-increase symbols 540, 550 from the quantity of possible information options for single-information option 510 is understandable, since the extent of a traffic disruption is very important for determining the optimal navigation, for instance, of a vehicle.

Figure 8 shows a block diagram of a first exemplary embodiment of transmitter 301 according to the present invention. In the first exemplary embodiment of transmitter 301 of the present invention, transmitter 301 is used in particular as a stationary transmitter for transmitting traffic information 410 to at least one receiver via a preferably wireless communication channel. The communication channel can be unidirectional or bidirectional. The use of an SMS (Service Management System) Cellbroadcast method, particularly in a GSM radio communications network, a classic

radio program transmission or the like, for the information transfer between transmitter 301 and receiver 300 can be mentioned here as an example of a unidirectional communication channel. The utilization of a short-message channel, e.g. the SMS short-message channel in a GSM radio communications network or the like, is mentioned here as an example of a bidirectional communication channel. Transmitter 301 includes a transmitting unit 312 which is connected to a conditioning circuit 321. Conditioning circuit 321 is connected to a distribution device 340. Distribution device 340 is connected to a memory 342 and an information source 395. Memory 342 contains traffic information 410 which can be supplied to conditioning circuit 321 via distribution device 340. Allocated to conditioning circuit 321 is a coder for traffic information 410, particularly TMC-coded traffic information, which codes traffic information 410 in accordance with the subset, according to the present invention, of a coding protocol, for example, the ALERT-C Syntax. Traffic information 410 coded in this manner can subsequently be transmitted by transmitting unit 312 via a public or private communication channel. Information source 395 passes on information via distribution device 340 to memory 342 and/or conditioning circuit 321. On the one hand, this information contains traffic information 410, e.g. concerning currently existing traffic disruptions or their absence. The information supplied by information source 395 also includes information about information inquiries or the like, particularly from one or more receivers 300. To receive signals from receiver 300, for example, of information inquiries or the like, in one preferred specific embodiment, a receiving unit is allocated to information source 395 of transmitter 301. The receiving unit is able to receive information from a receiver 300 via a communication channel agreed upon between receiver 300 and transmitter 301. Because of the presence of a receiving unit in transmitter 301, transmitter 301 could also be called a transmitter-receiver. Here, however, the designation transmitter 301 was selected, because transmitter 301 is used predominately to send traffic information to one or more receivers 300.

Traffic information 410 is coded in conditioning circuit 321 as a function of the information supplied by information source 395 and as a function of traffic information 410 located in memory 342, the coding being carried out according to the

subset of the present invention.

Public or private communication channels are suitable for the communication between receiver 300 according to the first or the second exemplary embodiment and transmitter 301. When using a private communication channel, e.g. according to the GSM Standard, transmitter 301 transmits traffic information 410 according to the subset to receiver 300, for instance, via a short-message channel, in particular using SMS short messages. When sending traffic information 410 using SMS short messages, the method of the present invention, receiver 300 of the present invention and transmitter 301 of the present invention again offer the advantage that more traffic information 410 can be transmitted per SMS short message, because the coding of traffic information 410 in accordance with the subset, according to the present invention, of the predetermined regulations results in smaller pieces of traffic information.

Transmitting unit 310 of receiver 300 makes it possible, for example, to dispatch information inquiries to transmitter 301. Transmitter 301 receives the information inquiry from preferably mobile receiver 300, and sends traffic information 410 to receiver 300 via a public or private communication channel, traffic information 410 being received by receiving unit 311 of receiver 300 and being processed by the further device and units of receiver 300 and output to a user by output device 384.

Input devices 382 permit the user to input, for example, information about the navigation destination into receiver 300. Input device 382 routes the input information of the user to distribution device 340, which supplies it in particular to navigation unit 360. As a function of the input information, navigation unit 360, via distribution device 340, causes evaluation circuit 320 to generate an information inquiry according to the subset of the present invention in a TMC coder allocated to evaluation circuit 320. The information inquiry can be sent to transmitter 301 by transmitting unit 310.

Abstract Of The Disclosure

A method and a device [(300)] are proposed which are used for transmitting digitally coded traffic information [(410)] according to predetermined regulations from a transmitter to at least one receiver via a communication channel, a subset of the predetermined regulations being defined and the traffic information being coded, transmitted and decoded according to the subset.

[10191/1832]

METHOD, RECEIVER AND TRANSMITTER FOR TRANSMITTING DIGITALLY CODED TRAFFIC INFORMATION

Background Information

The present invention is based on a method according to the species defined in the Main Claim, a receiver according to the species defined in the alternative independent Claim 7, and a transmitter according to the species defined in the alternative independent Claim 13. The European Draft Standard ENV/278/4/1/0012 describes a coding protocol for traffic information which is able to communicate information concerning many types of traffic information. Included is construction-site information, weather information, information about traffic disruptions or the like, the information touching upon national and international primary routes, regional routes, as well as local and rural routes.

Summary of the Invention

In contrast, the method of the present invention having the features of the Main Claim, the receiver of the present invention having the features of the alternative independent Claim 7, and the transmitter of the present invention having the features of the alternative independent Claim 13 have the advantage that a subset of the regulations predetermined in the European Draft Standard is used for coding and decoding traffic information. Traffic messages can thereby be kept shorter and are less complex. First of all, this facilitates the coding of traffic information coded according to the subset, because it is only necessary to take a smaller number of information options into account. Furthermore, the use of the subset according to the present invention facilitates the transmission of traffic information, because the traffic information thus coded is shorter. Moreover, the decoding of traffic information by the use of the subset, according to the present invention, of the predetermined regulations for coding traffic information is made easier, because the traffic

information contains less optional information.

The measures specified in the dependent claims permit advantageous further developments and improvements of the method indicated in the Main Claim and the device indicated in the alternative independent claim.

It is advantageous that the information options of the subset provide for exactly one information block. The traffic information can thereby be kept smaller, which leads to a shorter transmission time, lower transmission costs, and a simpler processing of the traffic information.

If the method of the present invention is carried out according to the RDS code, not more than double groups are thereby possible as multiple groups. The fact that information options of the subset allow for exactly one information block can also be expressed in the manner that, according to the present invention, information options may not have a separator which separates the information blocks from one another. The predetermined length of one information block, together with the regulation that no separator may be present in an information option leads to the fact that traffic information which is coded according to the subset includes double groups at most. The same result follows due to the requirement that information options may contain only one information block.

It is also advantageous that a first extent-of-increase symbol and/or a second extent-of-increase symbol can occur as a single-information option within an information block. The extent-of-increase symbols are used to precisely characterize the extent of a traffic disruption. Particularly for navigational purposes, it is important to supply precise information regarding the extent of traffic disturbances to a navigation unit. On the other hand, other possible components of a single- information option are not provided in the subset for the coding of traffic information. This serves to reduce the coding and decoding expenditure.

It is furthermore advantageous that a single-event option only provides for a second piece of length information. Other possible components of a single-event option are

therefore not provided in the subset for the coding of traffic information. This helps to simplify the coding and decoding process.

Another advantage is that a multiple-use option provides for one optional event. Because of this, information can be transmitted about complex situations, since more than one event can be transmitted per piece of traffic information. In addition, it is advantageous that, for each optional event, one piece of length information is transmittable as single-event option in the information block.

Moreover, it is advantageous that one piece of location information, which is provided in the information portion of the traffic information coded according to the subset, is present in coded form in accordance with a location table. Location information, which is transmitted in the information portion, is thereby not permissible in the form of a piece of EUROAD location information, which leads to a simpler structure of the traffic information.

It is advantageous if the receiver of the present invention has a receiving unit, signals which include traffic information coded according to the subset being receivable by the receiving unit. Because of this, it is possible for a mobile device according to the present invention to receive and to further process traffic information coded according to the subset.

Furthermore, it is advantageous that the receiver of the present invention has a transmitting unit, signals which include information inquiries and/or coded traffic information being transmittable by the transmitting unit. Thus, for example, with the aid of a mobile receiver which has a transmitting unit, signals such as information inquiries, traffic messages, coded traffic information or the like can be sent to a transmitter.

It is expedient if the receiver of the present invention includes a TMC decoder by which traffic information can be decoded according to the subset. This permits the receiver to selectively process the traffic information coded according to the subset.

It is particularly advantageous if the receiver of the present invention and the transmitter of the present invention have a memory in which traffic messages, coded according to the subset, can be stored. Due to the coding of the traffic messages according to the subset of the predetermined regulations, less memory space is required in the memory per traffic message. Therefore, given the same capacity, a memory in the receiver according to the present invention and in the transmitter according to the present invention can accommodate more traffic messages, or it can have smaller dimensions for the same number of traffic messages.

It is also advantageous that the receiver of the present invention has a navigation unit which includes means for processing the information content of traffic messages. In this manner, a navigational task can be carried out more quickly and easily through the use of traffic information coded according to the subset of the predetermined regulations.

It is advantageous that the transmitter has a transmitting unit, signals which include coded traffic information being transmittable by the transmitting unit. For example, it is possible for a preferably stationary transmitter of the present invention, which has a transmitting unit, to dispatch signals which include traffic information coded according to the subset. The traffic information sent out in this manner can then be received by a mobile receiver via a public or a private communication channel.

It is advantageous that the transmitter has a receiving unit, signals which include information inquiries and/or coded traffic information being receivable by the receiving unit. A receiving unit permits the transmitter to receive information from one or more receivers, and thereby to send traffic information selectively to specific receivers, i.e. to send a specific selection of traffic information to certain receivers.

It is moreover advantageous that the transmitter includes a TMC coder by which traffic information, coded according to the subset, can be coded. In this manner, traffic information coded according to the subset can be transmitted to one or more receivers. An agreement for the exclusive transmission of traffic information, coded according to the subset, is advantageous. Because the receiver receives only such

traffic information which is coded according to the subset, it can have a simpler and therefore more cost-effective design. In addition, this leads to a simpler transmit mode in the transmitter, because according to the present invention, the traffic information is small.

Brief Description of the Drawing

Exemplary embodiments of the present invention are explained more precisely in the following description and depicted in the Drawing, in which:

Figure 1	shows a representation of one piece of traffic information;
Figure 2	shows a representation of one piece of location information;
Figure 3	shows a representation of one information option;
Figure 4	shows a representation of one information block;
Figure 5	shows a representation of one single-information option;
Figure 6	shows a block diagram of a first exemplary embodiment of the receiver according to the present invention;
Figure 7	shows a block diagram of a second exemplary embodiment of the receiver according to the present invention; and
Figure 8	shows a block diagram of a first exemplary embodiment of the transmitter according to the present invention.

Description of the Exemplary Embodiments

Figures 1 through 5 show a coding protocol for TMC traffic messages according to a subset of the ALERT-C Syntax. This Syntax is specified in the European Draft Standard cited. When introducing new terms, the corresponding English term from the European Draft Standard is indicated in parentheses. The method of the present invention utilizes a subset of the standardized regulations, for example, of the ALERT-C Syntax, for coding and decoding traffic information. The method of the present invention for coding traffic messages exclusively uses regulations which likewise occur in the quantity of standardized regulations, for example, of the ALERT-C Syntax. However, from this quantity of regulations, a subset is selected in

order to more effectively carry out the coding, the transmission and the decoding of traffic information. The subset, selected according to the present invention, is selected in view of a particularly effective processing of the traffic information. For example, according to the present invention, the selection of the subset is particularly suitable for more effective navigation, especially of vehicles. The selection of the subset in view of this exemplary usage is described in the following on the basis of the selection, according to the present invention, of a subset of the ALERT-C Syntax. However, the selection of a subset from a quantity of predetermined regulations is restricted neither to a quantity of regulations in conformance with the ALERT-C Syntax, nor is it restricted to a quantity of regulations in conformance with the RDS (Radio Data System) Standard or with the TMC (Traffic Message Channel) Standard.

Figure 1 shows the representation of one piece of traffic information 410. Traffic information 410 is made of an information portion (MandatoryTokens) and of information options 440 (OptionTokens). The information portion is composed of one piece of event information 420 (Event) and of one piece of location information 430 (LocationTokens). Event information 420 and location information 430 together form the information portion of traffic information 410, the sequence of event information 420 and location information 430 in the information portion being irrelevant.

Figure 2 shows location information 430. It is composed in succession of a first location 450 (PrimaryLocation), a piece of extent information 460 (Extent) and a piece of direction information 470 (Direction).

Figure 3 shows information option 440. It is composed either of one piece of single-group information (SingleGroupOptions) or of one or more information blocks (500) (Infoblock). If information options 440 include multiple-group options, for example, according to the RDS-TMC Standard, then the multiple-group options are composed of information blocks 500. In the following, one information option 440 is made either of single-group options or of one or more information blocks 500. According to the present invention, information options 440 are composed of precisely one information block 500. The single-group options can include one piece of diversion information 480 (DiversionBit) and one piece of disruption-duration

information 490 (DurationCode).

Figure 4 shows information block 500 (Infoblock). Information block 500 can include a single-information option 510 (SinglePerMessageOpt), a multiple-use option 520 (MultipleUseOption) and/or a single-event option 530 (SinglePerEventOpt).

Figure 5 shows a single-information option 510. It is composed of a first extent-of-increase symbol 540 (CtrlIncrExtent8) and/or of a second extent-of-increase symbol 550 (CtrlIncrExtent16).

According to the ALERT-C Syntax, traffic information 410, for example, TMC traffic messages (Traffic Message Channel), is composed of the information portion and information options 440.

According to the TMC Standard for traffic messages, traffic information 410 is possible composed of one group of information, and traffic information 410 is possible composed of a plurality of groups of information. (see cited standard page 43ff). According to the present invention, only traffic information is possible which is composed of one or two groups. However, the invention is not bound to a use according to the RDS-TMC Standard. The information portion is contained in each piece of coded traffic information 410, while information options 440 are only optionally contained in traffic information 410. This is shown in Figure 1. The information portion as an obligation includes event information 420 and location information 430. The sequence of event information 420 and location information 430 is unimportant in the information portion; however, the presence of both pieces of information is necessary. Event information 420 contains the event of traffic information 410 in the form of an event code (EventCode). Using a table of possible events, thus an event list (EventList), the event can be described with the aid of event information 420.

In one advantageous specific embodiment of the method according to the present invention, the event list of the present invention is reduced compared to the event list of the ALERT-C Syntax, so that events which occur in the event list of the ALERT-C

Syntax are not allowed according to the subset of the present invention, that is to say, a plurality of events from the event list of the ALERT-C Syntax are mapped onto one event from the event list of the present invention.

According to the ALERT-C Syntax, location information 430 includes one first location 450, one piece of extent information 460 and one piece of direction information 470. According to the ALERT-C Syntax, first location 450 can be described either on the basis of a location code (LocationCode) using a location table, or with the aid of a EUROAD location (EUROAD Location). In one particularly advantageous specific embodiment of the method according to the present invention, first location 450 is described exclusively with the aid of the location code and the location table, the method thereby being simplified, particularly with respect to decoding, coding, and error handling.

Extent information 460 and direction information 470 are used im accordance with the regulations of the ALERT-C Syntax in the subset, according to the present invention, of the ALERT-C Syntax, as well.

Information options 440 of the ALERT-C Syntax and their use according to the subset are described in the following. According to the RDS-TMC Standard, information options 440 include either the single-group options, or one or more information blocks 500. The single-group information includes diversion information 480 and disruption-duration information 490. If information options 440 are composed of one piece of single-group information, then information options 440 include diversion information 480 and disruption-duration information 490.

On the other hand, information options 440 can be composed of one or more information blocks 500. According to the ALERT-C Syntax, a plurality of information blocks are separated by separators (Separator). The use of separators, and thus of at least two information blocks, requires that traffic information 410 be composed of at least three groups according to the RDS-TMC Standard. This should be avoided with the method of the present invention. In the present invention, the number of groups of one piece of traffic information 410 should amount to two at the

most. Therefore, the use of a separator in a multiple-group option 500 is not provided in the method according to the invention. Consequently, information options 440 of the present invention are composed merely of one information block 500 or of single-group options.

According to the subset of the present invention, one information block 500 can be made of single-information options 510, multiple-use options 520 or single-event options 530.

According to the method of the present invention, a single-information option 510 can contain only a first extent-of-increase symbol 540 and/or a second extent-of-increase symbol 550.

In accordance with the subset, according to the present invention, of the ALERT-C Syntax, a multiple-use option 520 can allow for only one optional event (OptEvent).

According to the method of the present invention, a single-event option 530 can provide for only one piece of length information (Length). In this context, the length information can relate to event information 420. When an optional event in a multiple-use option 520 is also transmitted in traffic information 410, then a further single-event option 530 can provide a further piece of length information with respect to the optional event. Therefore, it is possible, for each event, to transmit a piece of length information as single-event option 530.

In one particularly advantageous specific embodiment of the invention, further information options 440 are not provided. This simplifies traffic information 410, as well as its coding, decoding and processing.

Figure 6 shows a block diagram of a first exemplary embodiment of a receiver 300 with which the method of the present invention can be carried out. Receiver 300 includes a receiving unit 311 which is connected to an evaluation circuit 320. Evaluation circuit 320 is connected to a distribution device 340. Further connected to distribution device 340 are a memory 342, a navigation unit 360, reproduction devices

384, as well as input devices 382. Navigation unit 360 is also connected to a navigation data memory 362. Receiver 300 is designed in particular as a mobile device 300 for the reception of traffic messages 410, coded according to the method of the present invention, for example, in a vehicle.

Figure 7 shows a block diagram of a second exemplary embodiment of receiver 300 according to the present invention; in the second exemplary embodiment of receiver 300 according to the present invention, evaluation circuit 320, in addition to being connected to receiving unit 311, is also connected to a transmitting unit 310. Otherwise, the same reference numerals from Figure 6 are used for units and devices of receiver 300 having essentially the same function. The transmitting unit is used, for example, to dispatch information inquiries, traffic messages, coded traffic information or the like. Receiver 300 could also be called a transmitter-receiver, inasmuch as receiver 300 can also include a transmitting unit 310. However, when implementing the method, preferably mobile receiver 300 is used chiefly as a receiver, which is why the term "receiver" was selected.

In one advantageous specific embodiment of receiver 300 of the present invention, receiving unit 311 and transmitting unit 310 can also be combined to form one transmitter-receiver unit. In particular, such a transmitter-receiver unit can be designed in such a way that it includes a mount for a portable telecommunication terminal, e.g. a mobile telephone, so that the transmitter-receiver unit is only operable after connection of the portable telecommunication terminal to the transmitter-receiver unit, for example by insertion or the like. The various units and devices of the receiver of the present invention according to the first exemplary embodiment and according to the second exemplary embodiment can be distributed over various housings, or be integrated in one housing. In this context, in particular individual units and devices of receiver 300 of the present invention can be combined in one housing with a further device. Thus, for example, it is possible to integrate input device 382 and reproduction device 384 in one broadcast receiver. In this case, the broadcast receiver is connected to receiver 300 via a wire-conducted or wireless connection, e.g. a CAN bus or the like.

With the aid of receiving unit 311, traffic information 410 can be received and evaluated in evaluation circuit 320. To that end, evaluation circuit 320 is assigned a TMC decoder which decodes the arriving traffic information. Received traffic information 410 can be routed from evaluation circuit 320 via distribution device 340 to memory 342, navigation unit 360 and/or output device 384. Traffic information 410 can be stored in memory 342 when, for example, it is received at regular or irregular time intervals by receiving unit 311 of receiver 300. Due to traffic information 410 stored in memory 342, traffic information 410 can be processed, for example, by navigation unit 360 regardless of whether traffic information 410 is arriving or not.

Traffic messages 410 are coded according to predetermined regulations, for example, according to the ALERT-C Syntax. In the present invention, the selection of a subset of these regulations makes it possible to keep memory 342 small for a predetermined amount of traffic information 410 to be stored, or to utilize memory 342 for a greater amount of traffic information 410, because traffic information 410 turns out to be smaller according to the present invention than according to the predetermined regulations, for example, of the ALERT-C Syntax. This is attributable in particular to the fact that, when working with the subset of the present invention, only traffic information 410 is dealt with which includes two groups at the most. Due to the thus shorter transmission times of traffic information 410, in addition, more information 410 can be received by receiving unit 311 per time unit.

Furthermore, traffic information 410 is decoded in evaluation circuit 320 more quickly and with less expenditure.

According to the present invention, only the information necessary for the main purpose of the information processing is coded in one piece of traffic information 410. By way of example, the subset of the present invention is selected which is particularly important for processing traffic information 410, e.g. in navigation unit 360, for carrying out navigation tasks. For this purpose, in the method of the present invention and when working with receiver 300 of the present invention, only the information from the possible information supply of the predetermined regulations, particularly of the ALERT-C Syntax, which is important with regard to carrying out

navigation tasks is selected for the subset. Thus, for example, the selection of first and second extent-of-increase symbols 540, 550 from the quantity of possible information options for single-information option 510 is understandable, since the extent of a traffic disruption is very important for determining the optimal navigation, for instance, of a vehicle.

Figure 8 shows a block diagram of a first exemplary embodiment of transmitter 301 according to the present invention. In the first exemplary embodiment of transmitter 301 of the present invention, transmitter 301 is used in particular as a stationary transmitter for transmitting traffic information 410 to at least one receiver via a preferably wireless communication channel. The communication channel can be unidirectional or bidirectional. The use of an SMS Cellbroadcast method, particularly in a GSM radio communications network, a classic radio program transmission or the like, for the information transfer between transmitter 301 and receiver 300 can be mentioned here as an example of a unidirectional communication channel. The utilization of a short-message channel, e.g. the SMS short-message channel in a GSM radio communications network or the like, is mentioned here as an example of a bidirectional communication channel. Transmitter 301 includes a transmitting unit 312 which is connected to a conditioning circuit 321. Conditioning circuit 321 is connected to a distribution device 340. Distribution device 340 is connected to a memory 342 and an information source 395. Memory 342 contains traffic information 410 which can be supplied to conditioning circuit 321 via distribution device 340. Allocated to conditioning circuit 321 is a coder for traffic information 410, particularly TMC-coded traffic information, which codes traffic information 410 in accordance with the subset, according to the present invention, of a coding protocol, for example, the ALERT-C Syntax. Traffic information 410 coded in this manner can subsequently be transmitted by transmitting unit 312 via a public or private communication channel. Information source 395 passes on information via distribution device 340 to memory 342 and/or conditioning circuit 321. On the one hand, this information contains traffic information 410, e.g. concerning currently existing traffic disruptions or their absence. The information supplied by information source 395 also includes information about information inquiries or the like, particularly from one or more receivers 300. To receive signals from receiver 300, for

example, of information inquiries or the like, in one preferred specific embodiment, a receiving unit is allocated to information source 395 of transmitter 301. The receiving unit is able to receive information from a receiver 300 via a communication channel agreed upon between receiver 300 and transmitter 301. Because of the presence of a receiving unit in transmitter 301, transmitter 301 could also be called a transmitter-receiver. Here, however, the designation transmitter 301 was selected, because transmitter 301 is used predominately to send traffic information to one or more receivers 300.

Traffic information 410 is coded in conditioning circuit 321 as a function of the information supplied by information source 395 and as a function of traffic information 410 located in memory 342, the coding being carried out according to the subset of the present invention.

Public or private communication channels are suitable for the communication between receiver 300 according to the first or the second exemplary embodiment and transmitter 301. When using a private communication channel, e.g. according to the GSM Standard, transmitter 301 transmits traffic information 410 according to the subset to receiver 300, for instance, via a short-message channel, in particular using SMS short messages. When sending traffic information 410 using SMS short messages, the method of the present invention, receiver 300 of the present invention and transmitter 301 of the present invention again offer the advantage that more traffic information 410 can be transmitted per SMS short message, because the coding of traffic information 410 in accordance with the subset, according to the present invention, of the predetermined regulations results in smaller pieces of traffic information.

Transmitting unit 310 of receiver 300 makes it possible, for example, to dispatch information inquiries to transmitter 301. Transmitter 301 receives the information inquiry from preferably mobile receiver 300, and sends traffic information 410 to receiver 300 via a public or private communication channel, traffic information 410 being received by receiving unit 311 of receiver 300 and being processed by the further device and units of receiver 300 and output to a user by output device 384.

Input devices 382 permit the user to input, for example, information about the navigation destination into receiver 300. Input device 382 routes the input information of the user to distribution device 340, which supplies it in particular to navigation unit 360. As a function of the input information, navigation unit 360, via distribution device 340, causes evaluation circuit 320 to generate an information inquiry according to the subset of the present invention in a TMC coder allocated to evaluation circuit 320. The information inquiry can be sent to transmitter 301 by transmitting unit 310.

What is claimed is:

1. A method for transmitting digitally coded traffic information (410) according to predetermined regulations between a transmitter and at least one receiver via a unidirectional and/or bidirectional communication channel,
wherein a subset of the predetermined regulations is defined and the traffic information (410) is coded, transmitted and/or decoded according to the subset.

2. The method as recited in Claim 1,
wherein the subset provides for information options (440), the information options (440) provide for information blocks (500), the information options (440) providing for precisely one information block (500).

3. The method as recited in Claim 2,
wherein the information block (500) provides for one single-information option (510), the single-information option (510) of the subset providing for a first extent-of-increase symbol (540) and/or a second extent-of-increase symbol (550).

4. The method as recited in Claim 2 or 3,
wherein an information block (500) provides for one single-event option (530), the single-event option (530) providing for one piece of length information.

5. The method as recited in Claim 2, 3 or 4,
wherein an information block (500) provides for one multiple-use option (520), the multiple-use option (520) providing for one optional event.

6. The method as recited in Claims 2 through 5,
wherein the subset provides for an information portion, the information portion provides for one piece of location information (450), the piece of location information (450) of the subset being present in the information portion in coded form according to a location table.

7. A receiver (300) for the reception and processing of digitally coded traffic information (410) according to the method as recited in one of the preceding claims, wherein the receiver (300) has means for decoding traffic information (410) according to the subset.

8. The receiver (300) as recited in Claim 7,
wherein the receiver (300) has a receiving unit (311), signals which include coded traffic information (410) being receivable by the receiving unit (311).

9. The receiver (300) as recited in Claim 7 or 8, wherein the receiver (300) has a transmitting unit (310), signals which include information inquiries and/or coded traffic information (410) being transmittable by the transmitting unit (310).

10. The receiver (300) as recited in Claims 7 through 9, wherein the receiver (300) includes a TMC decoder by which traffic information (410) can be decoded according to the subset.

11. The receiver (300) as recited in Claims 7 through 10,
wherein the receiver (300) has a memory (342) in which traffic information (410) can be stored.

12. The receiver (300) as recited in Claims 7 through 11,
wherein the receiver (300) has a navigation unit (360) that includes means for processing the information content of traffic messages.

13. A transmitter (301) for the conditioning and transmitting of digitally coded traffic information (410) according to the method as recited in one of Claims 1 through 6, wherein the transmitter (301) has means for coding traffic information (410) according to the subset.

14. The transmitter (301) as recited in Claim 13, wherein the transmitter (301) has a transmitting unit (312), signals which include coded traffic information (410) being transmittable by the transmitting unit (312).

15. The transmitter (301) as recited in Claim 13 or 14, wherein the transmitter (301) has a receiving unit, signals which include information inquiries and/or coded traffic information (410) being receivable by the receiving unit.

16. The transmitter (301) as recited in Claims 13 through 15, wherein the transmitter (301) includes a TMC coder, traffic information being codable according to the subset by the TMC coder.

17. The transmitter (301) as recited in Claims 13 through 16, wherein the transmitter (301) has a memory (342) in which traffic messages can be stored.

Abstract

A method and a device (300) are proposed which are used for transmitting digitally coded traffic information (410) according to predetermined regulations from a transmitter to at least one receiver via a communication channel, a subset of the predetermined regulations being defined and the traffic information being coded, transmitted and decoded according to the subset.

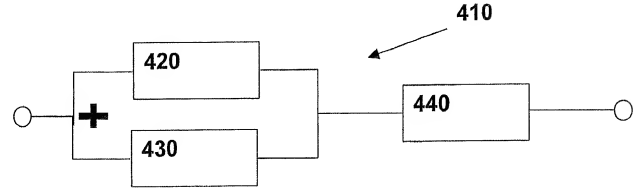

Fig 1

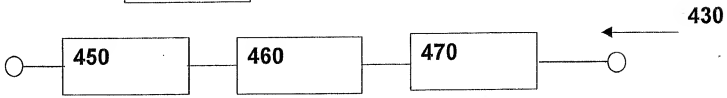

Fig 2

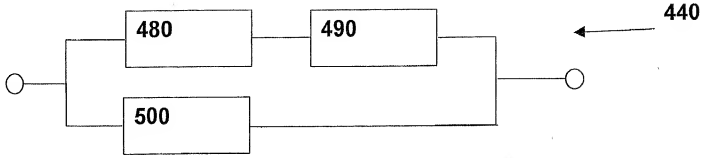

Fig 3

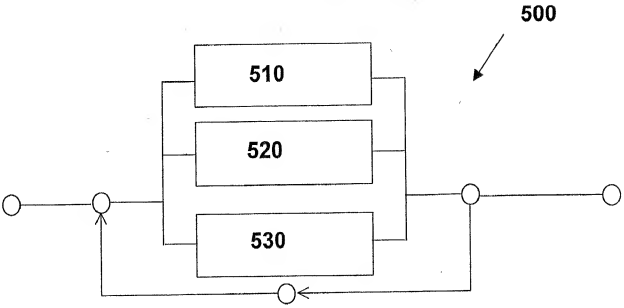

Fig 4

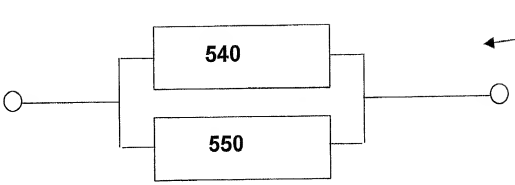

Fig 5

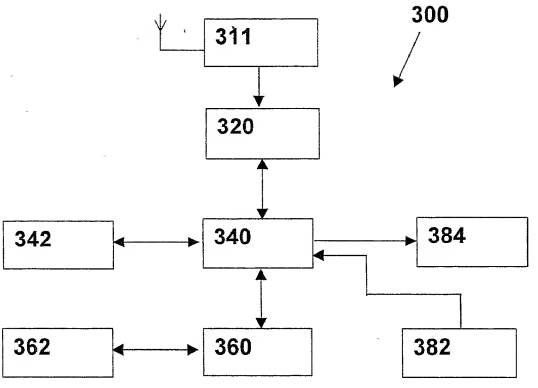

Fig 6

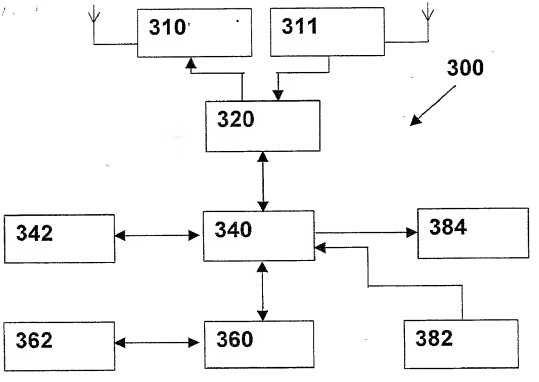

Fig 7

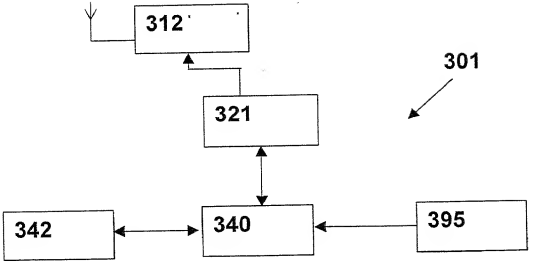

Fig 8

[10191/1832]

COMBINED DECLARATION AND
POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below adjacent to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **METHOD, RECEIVER AND TRANSMITTER FOR TRANSMITTING DIGITALLY CODED TRAFFIC INFORMATION**, and the specification of which:

[ ] is attached hereto;

[ ] was filed as United States Application Serial No. and,

[x] was filed as PCT International Application Number PCT/DE99/03145, on the 30th day of September, 1999

[ ] an English translation was previously submitted.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I hereby claim foreign priority benefits under Title 35, United States Code § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international applications(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

~~EL244503951~~
EL244506670US

PRIOR FOREIGN/PCT APPLICATION(S)
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119

Country : Federal Republic of Germany

Application No. : 198 55 638.1

Date of Filing: 02 December 1998

Priority Claimed
Under 35 U.S.C. § 119 : [x] Yes [ ] No

I hereby claim the benefit under Title 35, United States Code § 120 of any United States Application or PCT International Application designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations § 1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR
PCT INTERNATIONAL APPLICATIONS
DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. § 120

U.S. APPLICATIONS

Number :

Filing Date :

PCT APPLICATIONS
DESIGNATING THE U.S.

PCT Number :

PCT Filing Date :

I hereby appoint the following attorney(s) and/or agents to prosecute the above-identified application and transact all business in the Patent and Trademark Office connected therewith.

(List name(s) and registration number(s)):

Richard L. Mayer, Reg. No. 22,490
Gerard A. Messina, Reg. No. 35,952

All correspondence should be sent to:

Richard L. Mayer, Esq.
Kenyon & Kenyon
One Broadway
New York, New York 10004

CUSTOMER NO. 26646

Telephone No.: (212) 425-7200
Facsimile No.: (212) 425-5288

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of inventor **Bernd HESSING**

Inventor's signature _____ Date 25th July 2003

Citizenship: Federal Republic of Germany

Residence: Kreuzgarten 32
31188 Holle
Federal Republic of Germany

Post Office Address Same as above

Full name of inventor **Stefan GOSS**

Inventor's signature Stefan Goss Date 25.9.01

Citizenship: Federal Republic of Germany

Residence: Fichtestraße 11
31137 Hildesheim
Federal Republic of Germany

Post Office Address Same as above

Full name of inventor **Wolfgang WUNDERLICH**

Inventor's signature  Date 07-25-2001

Citizenship: Federal Republic of Germany

Residence: Dehnenweg 5
31137 Hildesheim
Federal Republic of Germany

Post Office Address Same as above